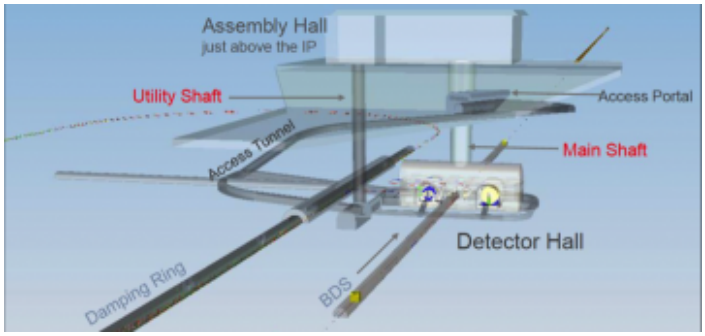
LC NEWSLINE
THE NEWSLETTER OF THE LINEAR COLLIDER COMMUNITY

FEATURE

A new way to tackle project management for the ILC

Change Management as a new tool for the ILC project to move forward

by Ricarda Laasch

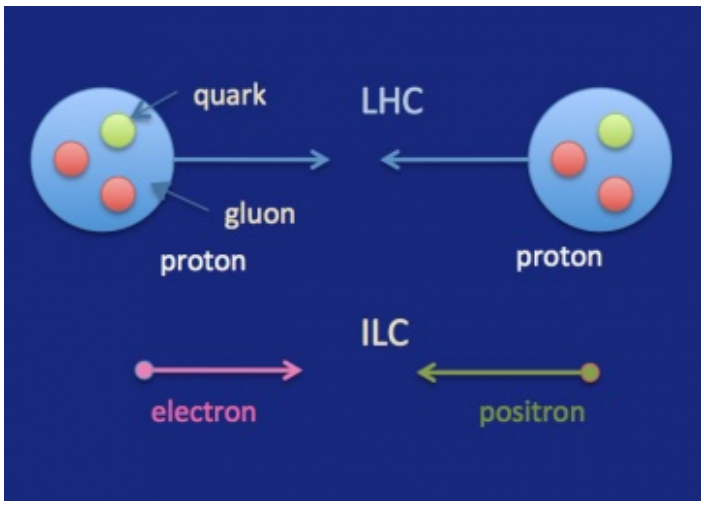


The technical design for the ILC was published in 2012. What happens if new technologies influence this design, or it needs to be adapted to the very specific conditions at the future site? A group called "Change Management" oversees, decides upon and documents all the changes to the design. Here is how it works.

DIRECTOR'S CORNER

ILC the discovery machine

by Hitoshi Yamamoto



It is often said that the ILC is a precision machine. One should note, however, that the ILC is actually a discovery machine that can find new phenomena and new particles LHC would not be able to discover. Hitoshi Yamamoto explains a few unique features of the ILC that make discovery possible.

IMAGE OF THE WEEK

“Let’s get it straight”

by Barbara Warmbein

The visual petition continues: scientists from DESY and the University of Hamburg recently gathered in the tunnel of the European XFEL to shoot this group #mylinearcollider video and a few others.

VIDEO OF THE WEEK

ILC Science Club kick off

From 1 June 2015, Japanese cable TV, Tokyo Cable Network (TCN) started to broadcast the new program "ILC Science Kids club." The program is available on YouTube with English subtitles.

IN THE NEWS

from ***Tanko Nichinichi***
2 July 2015
"Various Thoughts on MEXT ILC Panel of Experts Suggestions"
The panel of experts gave three recommendations: 1) To get the prospects for cost sharing among countries and for getting scientific results worth the massive investment 2) That the performance and obtainable results from the ILC be assessed by sufficiently analyzing and evaluating experimental trends of the LHC, and that solutions for technical issues and for reducing cost risks be made clear, and 3) To work for the understanding and consensus of the Japanese people and of other scientific fields.

from ***Kahoku Shinpo***
26 June 2015
＜ＩＬＣ＞人材確保策検証作業部会を設置
ＩＬＣ計画に関する有識者会議は２５日、計画に必要な人材の確保・育成方策を検証するための作業部会を設置した。作業部会では施設の建設や運営に必要な人員と、将来必要となる研究者、技術者の確保と育成の見通しなどを検討する。(The expert panel set up the new working group to study the way to secure and nurture the human resources to be needed to host the ILC.)

from ***Tanko Nichinichi***
26 June 2015
Making Sharing of Costs Clear
he Ministry of Education, Culture, Sports, Science and Technology (MEXT) panel of experts considering the ILC had their fourth meeting on June 25th. The panel summarized the issues and actions necessary for inviting the ILC to Japan, for the first time in the form of recommendations to MEXT.

from ***Iwate Nippo***
25 June 2015
ILC政府判断17～18年ごろ　有識者会議中間まとめ
ＩＬＣの日本誘致を検討する文部科学省の有識者会議は２５日、同省で開かれ、検証内容の中間まとめを行った。日本政府の判断は、実験結果が示される２０１７年から１８年ごろになる見通しだ。(Expert panel to discuss whether Japan to host ILC had a summary session on 25 June. The governmental decision is expected to be made in 2017 to 2018.)

from ***PICMG***
25 June 2015
MicroTCA.4 continues culture of COTS signal processing at DESY
In 2000 we were planning a very large linear accelerator at DESY, the 30 km-long linear collider TESLA (now as an international project continued named ILC).

from ***Сиб.фм.***
17 June 2015
Новосибирские физики помогут в строительстве линейного коллайдера в Японии
Работники новосибирского Института ядерной физики (ИЯФ) СО РАН примут участие в строительстве линейного коллайдера стоимостью в 10 млрд долларов в Японии, с помощью которого изучат свойства тёмной материи, рассказал изданию СО РАН «Наука в Сибири» главный научный сотрудник ИЯФ Валерий Тельнов. (Novosibirsk Institute of Nuclear Physics (INP) will take part in the construction of a linear collider, worth $ 10 billion in Japan, with which examine the properties of dark matter, said chief researcher of the INP Valery Tel'nov.)

from ***РОСНАУКА***
15 June 2015
Новосибирские физики помогут строить линейный коллайдер в Японии Подробнее
Правда, россиян включат в этот масштабный проект лишь в том случае, если будет принято решение на международном уровне о создании коллайдера. (True, the Russians will include in this large-scale project only if it is decided at the international level for the establishment of the collider.)

CALENDAR

Upcoming events

Meeting of the American Physical Society Division of Particles and Fields (DPF 2015)
Ann Arbor, Michigan, USA
04- 08 August 2015

XXVII International Symposium on Lepton Photon 2015 (LP 2015)
Ljubljana Exhibition and Convention Centre, Slovania
17- 22 August 2015

View complete calendar

PREPRINTS

ARXIV PREPRINTS

1507.01395
Reduced LHC constraints for higgsino-like heavier electroweakinos

1507.01739
Direct detection of singlet dark matter in classically scale-invariant standard model

1506.08371
LCFIPlus: A Framework for Jet Analysis in Linear Collider Studies

1506.08063
Gravitational mass of relativistic matter and antimatter

1506.07575
Z′ resonance and associated Zh production at future Higgs boson factory: ILC and CLIC

1506.07830
ILC Operating Scenarios

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FEATURE

A new way to tackle project management for the ILC

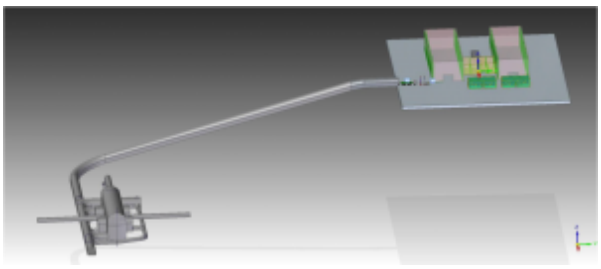
Change Management as a new tool for the ILC project to move forward

Ricarda Laasch | 9 July 2015

After the release of the Technical Design Report (TDR) in June 2013, the ILC project entered a new phase, in which the community awaits a (hopefully positive) decision for the project in Japan. As soon as the preferred location was announced, work began to adapt the accelerator to the building site in the Kitakami area. The TDR baseline design of the ILC has to undergo many adjustments and updates before the machine would reach the building phase. More detailed specification and technical drawings, further R&D and changes due to the specifics of the preferred project site were necessary. So one question arose: How best to handle all of these changes? How to document them, and what kind of communication and reviewing would be needed?
At this point a new tool was implemented for the ILC: Change Management. It started life as a tool to classify and structure the new inputs, but it has developed into an important driving force of the project.

“At the beginning the idea was really just to give everyone a tool to better communicate and track all the changes which need to be done. But it has become a real modus operandi for the project, ” says Benno List, physicist at DESY, who takes care of all the formal change requests for the ILC and by doing this helps to push the project forward. List is the Change Administrator of the ILC Change Management Board, which consists of the ILC’s nine Technical Board (TB) members, a civil engineering expert, and two designated representatives of the physics and detector community.

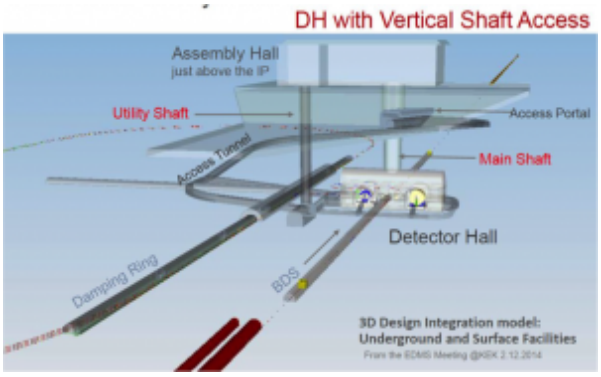
Change Management in general is a frequently used tool in industry to formalise the documentation process and to systematically handle changes during an ongoing project. This includes every step from the identification of the need for a change to the finished implementation and installation of the new design, procedures, or tools. “When we first installed this for ILC, people were skeptical, but it really evolved and it is now broadly accepted as the way of doing things for the project,” says List. “It helps a lot. The project has many participants in various institutes in different countries and the constant flow of information about further changes and developments guides the way for everyone.”



In the original TDR design, it was foreseen to access the underground experimental hall via an inclined horizontal tunnel.

In the report ‘Change Management for the ILC’ List and his colleagues explain the formalised process for change requests to the ILC baseline. The report clarifies the four main steps which are needed. The first step is the creation of the change request and its submission. The change request should be a document which specifies the requested change and its influence on the machine. The report should also include further important information like cost estimations and other details which will be needed to fully review the influence of the change. The second step is the evaluation of the change request. The CMB and – if needed – a group of experts review the requested change. “The review by the Change Review Panel can be a small project in itself. A central part of the whole process is communication. Everyone in the community should feel informed and take part in the activities. Changes are not made silently but always publicly announced including the recommendation of the experts and the CMB.” To be able to handle this List uses the ILC’s Engineering Data Management System (EDMS) which contains the baseline status of the ILC including technical drawings, specifications and R&D information on different aspects of the project. Broader discussions can take place in various forms of meetings at workshops and conferences. At these meetings anyone can state his or her opinion about the planned change.

The third step would be the decision making. Here a decision based on the discussion and recommendation of the experts is taken. This is documented including all reasons for this decision. Of course, the decision will also be publicly announced over the mailing lists. The final step is updating the ILC baseline to reflect the changes that have been made. To prevent continuous updating of the same sections in the baseline report, items which are affected by several change requests will be updated to reflect all change requests that have been accepted already. The resulting design is documented in the EDMS, where it is available for the whole community.



The change request was submitted by the MDI group to provide a vertical access shaft for the ILC experimental hall as well, so that the detectors could be assembled mainly above ground.

“We update the baseline constantly to prevent frustration. Nothing is more frustrating for the community than if time and effort is spent on something that is already made obsolete by another design change,” he says. This also helps to structure the ILC communities’ resources more effectively and brings the whole project forward. While one change request is processed, a waiting list with possible further changes is maintained. The CMB has its eyes on the various activities within the community and is in constant communication with the working groups so that a priority list concerning the required R&D, further specific changes and upcoming future changes can be developed as the projects evolves.

“The influence of the different change requests varies greatly. Some requests handle one specific part where other requests collect a few more changes and details together. One request even shifted the whole accelerator tunnel and the experimental hall by 800 metres from its original planned position, while another one just added a 10-centimetre long beam position monitor to the detectors,” recounts List. Since the baseline report of the ILC varies strongly in the level of detail, complexity and documentation within the different sections of the machine design, the CMB also handles changes in all their various stages of complexity and detail.
Most of the changes at this stage are introduced to fit the machine design into the possible site in Japan. So the changes influence the general setup, like the decision to move the cryogenic plants for the accelerator onto the surface, instead of keeping them underground in the tunnels as stated in the baseline. Others change the location of the whole accelerator tunnel within the landscape due to geographic properties, or add an extra shaft which enters vertically into the experimental halls to make the assembly of the detectors easier. Smaller changes deal with details concerning magnets and technical drawings which have needed updates due to further improve the function of those specific parts. More information about the already made changes on the ILC baseline will be soon available in *LC Newsline*.
There is one class of changes which is not handled by the CMB in this fashion: all changes regarding the highest level technical parameters such as energy and luminosity. Those changes are escalated to Linear Collider Collaboration (LCC) directorate and the Linear Collider Board (LCB) as required. The process is still documented with the help of the CMB.

“Right now, we have roughly one new change request per month coming up. Reviewing and implementing them gives us a working plan to move the project forward.”, says List about the amount of changes. The ILC community has embraced the idea of change management readily and is now using it as a way to structure its activities, and to bring together new solutions and ideas for the machine. This development is better than expected.
“It has really become a driving force of the project. This is remarkable,” concludes List about the impact of the CMB for the ILC.

CHANGE MANAGEMENT BOARD | EDMS | TECHNICAL DESIGN

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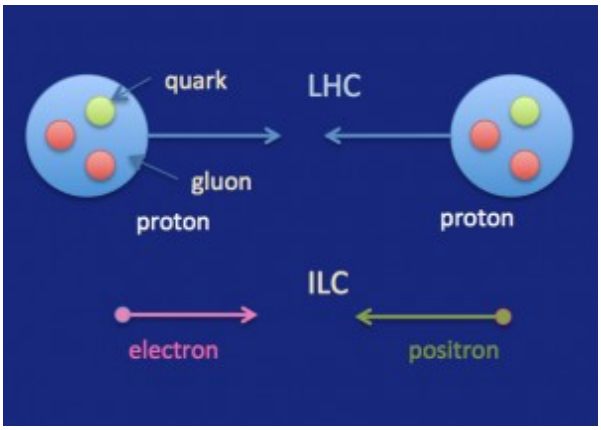
DIRECTOR'S CORNER

ILC the discovery machine

Hitoshi Yamamoto | 9 July 2015



At the ILC, collision will be very simple while at the LHC two composite particles makes complicated events.

It is often said that the ILC is a precision machine. One should note, however, that the ILC is actually a discovery machine that can find new phenomena and new particles LHC at CERN would not be able to discover. This capability is made possible by a few unique features of the ILC.

First, at the ILC, two elementary particles – namely, electron and positron, are collided while at the LHC two composite particles, protons, are collided. A proton is made of two up quarks and one down quark bound together by many gluons, and when they collide, many unwanted debris are produced. When a Higgs particle is produced at the LHC, the decay products of the Higgs particle is only a small fraction of all particles one observes in the collision. On the other hand at the ILC, most of the particles, or in many cases all the particles, one see come from a Higgs particle. The cleanliness is overwhelming. The situation has been likened to the difference between a collision of two raspberry pies and that of two raspberries. This gives the ILC a capability to find small signals of new particles or new phenomena.

Another advantage of the ILC is the control of the colliding electron and positron. The polarization of the colliding elementary particles can be specified as well as their energies. By controlling the polarizations, specific types of interactions can be turned on and off, thereby enabling to see small new effects coming from new physics. Sometimes, interactions that overwhelm a signal of new physics could be removed by the control of polarization leading to discovery.

The LHC is indeed a powerful machine with an impressive energy reach. A new run with energy upgrade has just begun and we are extremely excited about the prospect of new discoveries to come. Such a discovery may provide the ILC with a fantastic opportunity if the new particle is within the energy reach of the ILC. On the other hand, however, one should not forget that the new particle might be discovered first by the ILC. Since we are talking about new particles, it is difficult to predict what will happen. One could, however, pay attention to the Tevatron at Fermilab that can be considered as a younger brother of the LHC and shares many features of the LHC. The Tevatron has a glorious list of discoveries including that of the top quark. For the Higgs particle, however, it could not find a clear signal even though some twenty thousand Higgs particles were created. As we all know, the discovery of the Higgs particle had to wait for the LHC where about half a million Higgs particles were produced. At the ILC, only a handful of generated Higgs particles would do. It may be that a new particle are already produced at the LHC that as to wait for the ILC to be discovered.

Once a new particle is detected at the ILC, its nature can be fully elucidated by the ILC. Precision certainly is a great advantage of the ILC. For the measurements of interactions of the Higgs particles and other particles, indeed, the ILC is statistically equivalent to several tens of the ultimate LHCs running simultaneously. The ILC, however, is much more than a precision machine, it is in fact a tremendous discovery machine!

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IMAGE OF THE WEEK

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DESY | EUROPEAN XFEL | MYLINEARCOLLIDER

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VIDEO OF THE WEEK

ILC Science Club kick off

9 July 2015

From 1 June 2015, Japanese cable TV, Tokyo Cable Network (TCN) started to broadcast the new program “ILC科学少年団 (ILC Science Kids club).” This program is jointly produced by TCN and Advance Accelerator Association promoting science and technology (AAA), Japan’s industry-academia-government collaboration based on advanced accelerator technology.

The program is a situation-drama featuring the Tomoyuki Sanuki from Tohoku University as “Uncle Tomo,” who wil teach his nephew, Haru (Haruto Shimazaki) about how the world scientists tackling to solve the mysteries of the universe using cutting-edge accelerator.

In Episode 1, Haru meets Uncle Tomo, and finds out that there is a experimental devise called “accelerator” to solve the mysteries of the universe. The program is available on YouTube with English subtitles. Please turn the closed caption “On” to see the subtitles.

Check out the new Episode 2 just started to broadcast on 1 July, too! TCN plans to produce the series until March next year.